



UNIVERSITY OF GOTHENBURG
THE SAHLGRENSKA ACADEMY

Abstract - Master Thesis Project, the Pharmacy Programme

Expression and function of cannabinoid receptors in normal and osteoarthritic human articular chondrocytes

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Osteoarthritis (OA) is a progressive degenerative disease of joints, causing pain and disability. Although all joint tissues are affected, changes in articular cartilage are predominant. Recently cannabinoid receptors have been demonstrated in bone and the endocannabinoid system may be involved in the regulation of bone turnover.

Two cannabinoid receptors have been identified; CB1 and CB2. A third receptor, GPR55, also binds to certain cannabinoid agonists.

The aim of this study was to assess whether functional cannabinoid receptors are expressed by chondrocytes, the cells of cartilage, and to establish whether they may have a role in OA.

Expression of CB1, CB2 and GPR55 by chondrocytes extracted from human knee joint articular cartilage was assessed by RT-PCR and Western blotting. To investigate potential functions of the receptors, chondrocytes were stimulated with specific CB1 and CB2 agonists and phosphorylation of Akt, and the MAPkinases ERK and p38 assessed.

Normal and OA chondrocytes expressed RNA for all three cannabinoid receptors. Western blotting showed expression of CB2 and GPR55 in normal chondrocytes and all three receptors in OA chondrocytes. Normal chondrocytes stimulated by the CB1 and CB2 agonists did not show Akt or MAPkinase activation. Stimulation of OA chondrocytes with CB2 agonist showed phosphorylation of p38 but no activation of Akt or ERK.

These studies show that chondrocytes express cannabinoid receptors. Initial studies suggest that activation of CB2 in OA chondrocytes has different effects than on normal chondrocytes. Further studies are required to investigate whether the cannabinoid system is involved in the process of osteoarthritis.